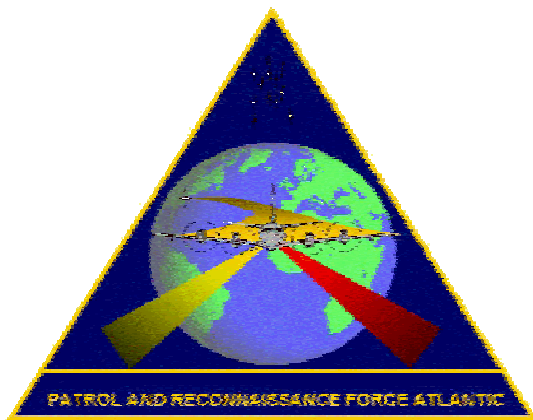


Concept of Operations (CONOPS)
for the
Search & Attack Variant
of the
Multi-Mission Maritime Aircraft (MMA)
November 2001



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Section 1 - Introduction

The United States Navy is in transition to address the new challenges posed by today's changing world environment. These challenges require forces trained, organized and equipped to meet a full range of military operations including deterrence, and if necessary, fighting and winning major theater wars and regional conflicts. The Navy will be a key element supporting forward presence and conducting rapid power projection, crisis response, and Military Operations other than War (MOOTW) in support of national interests. All of these operations require naval, joint and combined interoperability, and many require armed surveillance and reconnaissance in maritime and littoral environments. In response to the direction provided by the Defense Planning Guidance (DPG) FY 02-07, the Navy is developing the Multi-mission Maritime Aircraft (MMA) to operate effectively across this broad spectrum of mission requirements. The MMA will initially be developed in two versions; the Surveillance/Intelligence (SI) Variant, which will conduct those missions assigned to the Fleet Air Reconnaissance Squadrons (VQ), and the Search/Attack (SA) Variant, which will conduct those missions assigned to the Maritime Patrol Squadrons (VP).

The MMA is envisioned to address three main elements of the Defense Strategy: shape the international security environment, respond to a full spectrum of crises, and prepare for an uncertain future. It will directly support Department of Defense (DoD) Mission and Vision Statements as well as DoD Corporate Goals. In addition, MMA will fulfill guidelines articulated in the Chairman of the Joint Chiefs of Staff's *Joint Vision 2010* and *Joint Vision 2020* (JV 2010/JV 2020), which embrace four operations concepts – dominant maneuver, precision engagement, full-dimensional protection, and focused logistics – along with jointness, and interoperability, to achieve full spectrum dominance in all domains – sea, air, space, and information.

Key elements to achieving full spectrum dominance are information superiority and operations through the application of the concept of network-centric warfare (NCW). Information, information processing, and communications networks are the core of every military activity, and the sharing of this information through robust communications networks to provide common operational/tactical pictures to naval commanders is crucial to the Navy's effectiveness in supporting national interests. The SA MMA will be a major airborne asset providing intelligence, surveillance and reconnaissance information, information processing and communications in network-centric warfare.

1.1 Maritime Patrol and Reconnaissance Aviation Vision 2015

The Commanders of the Atlantic and Pacific Patrol and Reconnaissance Forces published their roadmap for the future of patrol and reconnaissance aviation in Maritime Patrol and Reconnaissance Aviation (MPRA) Vision 2015. Rooted in JV 2020, their focus is on providing the Unified and Fleet Commanders-in-Chief (CINCs) with a credible and agile combat ready force that can operate across the entire spectrum of conflict from peacetime engagement and shaping to combat operations, while providing mission support in several key mission areas:

- Undersea Warfare (USW) in both the open ocean and littoral operating environments;

- Anti-Surface Warfare (ASU);
- Wide area intelligence, surveillance, and reconnaissance (ISR) and maritime targeting support.

MPRA Vision 2015 stresses the enduring role of forward combat presence and the organizational transformation to a network-centric and knowledge superior force. The road ahead for MPRA requires:

- Advancing USW, ASU, maritime intelligence, surveillance, reconnaissance and filling a targeting role in support of the Navy's Maritime Power Projection strategy;
- Procuring and employing existing and emerging technologies to achieve real-time connectivity with the Battle Force in support of network-centric operations;
- Forging a viable tactical global presence; and
- Maximizing effectiveness and interoperability to enable an integrated MPRA community approach to combat and combat support.

Section 2 - Capabilities

The maritime patrol variant of MMA (hereafter referred to as the SA MMA) is being developed to replace the aging P-3C Orion while providing the vehicle for Maritime Patrol forces to continue to meet its missions throughout the first half of the 21st Century. The SA MMA will have an expanded focus on data collection, data processing and correlation, data fusion, and data dissemination. It will have superior connectivity with Naval, joint and allied forces. It will provide an opportunity to reduce Total Ownership Costs (TOC) while delivering improved capability, availability and supportability. The SA MMA will answer the need to sustain and improve subsurface and surface surveillance and reconnaissance capabilities for U.S. Naval forces in traditional, joint and combined roles to counter changing and emerging threats in both the open-ocean and the complex littoral environment. It will support the Navy's evolving war-fighting strategy of dominant maneuver, which demands an ability to achieve undersea and surface superiority rapidly within defined time parameters. The SA variant will operate a broad array of sensor systems that are tactically integrated within a network-centric command, control communications, computers and intelligence (C4I) architecture. It will possess the ability to accommodate new systems and technologies seamlessly to meet evolving subsurface and surface threats.

The SA MMA will be a multi-mission, long range, high endurance, land-based Navy aircraft that will provide timely crisis response for independent and coordinated Navy, joint and multi-national operations. It will perform effectively in day, night, and all weather conditions. It will be self-deployable and able to operate effectively from fixed overseas and U. S. support bases. The SA MMA will conduct missions traditionally assigned to the Patrol Squadrons (VP) in the current Required Operational Capability/Projected Operational Environment (ROC/POE) directive. Primary missions include anti-submarine and anti-surface warfare (ASW and ASU), command, control and communications (CCC), command and control warfare (C2W), intelligence (INT), mine warfare (MIW), and mobility (MOB), with supporting roles in anti-air warfare, maritime targeting and time critical targeting support, cargo and evacuation logistics services, search and rescue, counter-narcotic and law enforcement support, oceanographic collection and surveys, emergency/disaster assistance, and missions of state for diplomatic presence and humanitarian assistance. The SA MMA utility will span from peacetime operations, through MOOTW and small regional/small-scale contingencies (SRC/SSC), to a major theater war. In many cases, the SA MMA will be the first and only force in the area, and

the only reliable U. S. source capable of providing a comprehensive wide area tactical picture that can be injected into the network-centric C4ISR architecture.

An initial operating capability (IOC) date in the 2010-2012 timeframe requires an acquisition strategy that maximizes the use of mature technologies in order to minimize integration risk coupled with a robust upgrade plan that leverages frequent technology insertion to keep pace with evolving threats, brings required capability to warfighters and keeps operating and support costs affordable. Consequently, mission systems for initial SA variants will be comparable to, but no less capable than, upgrade programs currently being installed in the P-3C aircraft. Sensor system design will accommodate rapid commercial off-the-shelf (COTS) insertion and modular components to allow for easy reconfiguration as new technologies are developed. The ASW sensor suite will include a multi-spectrum family of sensors to neutralize subsurface threats in both the deep-water, open ocean and the complex shallow water, littoral environments.

In addition, the SA MMA will have the following:

- Aircraft flight performance characteristics comparable to or better than the P-3;
- Enhanced survivability;
- Easily reconfigurable systems architecture, compatible with legacy and growth systems;
- On-board mission planning;
- Multi-spectrum suite of sensor systems and high connectivity and interoperability with Navy, Joint and allied platforms and systems;
- Robust ability to deliver torpedoes, maritime air-to-surface weapons, mines, depth bombs, sonobuoys and other non-lethal ordnance;
- Rapid transition from alert to full mission capable status and rapid aircraft turnaround time;
- High mission reliability;
- Provisions for aerial refueling;
- Operations Security provisions; and
- Reduced total cost of ownership compared to the P-3.

Section 3 – Operational Concepts

The following sections provide top-level concepts of operations for each primary mission currently in the ROC/POE. While not tied to any particular scenario, these concepts will evolve to meet constantly changing requirements demanded by new threats, technology break-throughs, role and mission changes or budgetary limitations. MPR squadrons will continue to be among the leaders in adapting to changing maritime threats and philosophies.

3.1 Anti-Submarine Warfare (ASW)

The SA MMA will provide maritime superiority against submarines in both the open ocean and littoral operating environments. It will have the capability to search for, detect, locate, classify, track, and provide combat identification of subsurface targets. It will employ a multi-spectrum suite of ASW sensor systems capable of self-cueing and targeting, denying, disrupting or destroying (i.e., attacking) subsurface threats across the continuum of subsurface operating environments. The SA MMA will be capable of collecting and providing meteorologic and oceanographic (METOC) data and tactical data on subsurface targets to other assets through the use of on-board, off-board, and deployable systems. It will include provisions to improve survivability against threats originating either in the littoral or aboard the submarine itself.

MMA squadrons will be responsive to the spectrum of ASW tasking and will provide aircraft that can arrive on-scene within hours versus days for other ASW systems. MMA will be employed to respond to cueing from a variety of systems including Integrated Undersea Surveillance System assets, satellite generated datums, areas of probability based on communications intercepts or other intelligence sources that provide adequate information to merit single or multiple event operations.

Wide area search sensors capable of area sanitization or of detecting conventional or nuclear submarines will be employed to convert cueing from other sources into either areas that have been sanitized and do not contain threat submarines or a newer datum that provides the basis for continued operations. Passive and active search sensors effective against the spectrum of threats, including older diesel and nuclear submarines to modern diesel; air independent and nuclear submarines, will be used to generate contact and then subsequently identify and classify these submerged or surfaced targets.

Detection, classification and tracking of the submarine target as early as possible will obviate the need to continually regenerate datum and provide confidence that the threat can be dealt with effectively. In some instances, operations will be conducted to provide continuous tracking and targeting data; in others a single good fix periodically may prove sufficient to achieve military objectives. In many cases, MMA will be unarmed and unprovocative. It will often operate under restricted emission control (EMCON) conditions while at other times it will be free to use active sensors and unrestricted communications to accomplish its tasks. When required, MMA will carry undersea weapons capable of attacking the target as the rules of engagement permit.

MMA will also be involved in battle group support. ASW searches along projected transit track, area sanitization prior to arrival at the operations area, and outer or inner zone ASW operations are examples of how MMA will provide ASW support to battle groups. MMA may operate independently or in conjunction with battle group assets (destroyers, helicopters, friendly submarines, etc.). In addition to ASW search sensors, MMA will provide connectivity with battle group assets (network-centricity) and serve a data fusion role while controlling other ASW assets as on-scene commander. MMA will be the most flexible and responsive ASW asset available, as it can quickly respond to changes in threat axis and rapidly refocus its search efforts to largely separated geographic areas. It may be required to perform more than one mission simultaneously. It will quickly change from peacetime to wartime status and will provide the capability to shorten the sensor-to-shooter chain by combining search and localization sensors with weapons delivery and reliable, multi-path communications links.

MMA will provide escort to logistics convoys, Underway Replenishment Groups (URGs), Marine Expeditionary Units (MEUs), Amphibious Ready Groups (ARGs), and maritime prepositioned ship squadrons. ASW sanitization of sea lines of communications, choke points, operations areas as well as radar flooding, surface surveillance, surface warfare and command and control will all be facets of escort missions that will be performed simultaneously.

3.2 Anti-Surface Warfare (ASU)

The SA MMA will provide maritime superiority against surface ships, including Maritime Interdiction Operations. It will have the capability to search for, detect, locate, classify, track, and provide combat identification of surface targets. It will employ a multi-spectrum suite of sensor systems capable of self-cueing, targeting, and denying, disrupting or destroying surface threats across the continuum of operating environments. It will include provisions to improve survivability against threats originating either in the littoral or aboard the hostile surface units.

MMA will employ broad area search sensors (both active and passive) that provide the sensitivity to ensure complete coverage of the area of responsibility. Long-range detection with quick follow-up long-range classification, localization and track establishment is critical to either surface warfare or peacetime surveillance and reconnaissance. Classification and combat identification of targets are essential to ensure attrition by friendly fire is avoided.

MMA will be able to detect, classify and attack surface units with a variety of short and long-range weapons appropriate to the target and rules of engagement. Engagement in coordinated attacks with airborne strike, surface units, submarines, other MMA or allied maritime patrol can be accomplished effectively because of the broad range of weapons MMA will be capable of deploying. Survivability systems will allow MMA to play a critical role in these scenarios.

MMA may be employed either as a single unit providing Surface Combat Air Patrol to a battle group, URG, ARG, MEU, or as part of an integrated force against known or potential enemy surface threats. MMA will act as a gate guard at choke points or around harbors to ensure enemy access to the open ocean is controlled. Again, the SA MMA may be armed or unarmed as dictated by the rules of engagement, operational environment and political situation.

Related missions that fall just short of ASU but require similar sensors and weapons include quarantine, maritime interdiction operations and routine surface surveillance. The SA MMA may be required to carry weapons on these missions but may fly them unarmed as dictated by the rules of engagement, operational environment and political situation.

Network-centric capability, exchanging both non-organic targeting data and MMA targeting information (imagery and data) used by other weapons shooters, will pay dividends in any ASU scenario. Likewise, long-range standoff weapons tailored to the target while maintaining aircraft survivability are key enablers to MMA effectiveness.

3.3 Command, Control and Communications (C³)

The SA MMA will be interoperable with joint, national and multi-national forces and will serve as a C³ node in a network-centric C⁴ISR architecture. The SA MMA will achieve, maintain, and disseminate a comprehensive and timely undersea and surface battle space picture attaining, maintaining and disseminating current situational awareness. This picture will be fused from data from both on-board and off-board sensors. The MMA will receive information from airborne, surface and satellite and follow-on systems yet to be defined. The SA MMA will be a platform of choice for passing both fused and raw information to battle groups and joint task forces, joint and Navy command centers, and, in a sensor-to-shooter role, strike assets. Robust

communications suites providing both secure and unsecure data, voice, and imagery will be incorporated to optimize C3 effectiveness.

MMA will often be employed as on-scene commander because of the significant connectivity, data fusion and flexibility it will provide. It can act in a communications relay role while at the same time providing some other important capability (e.g., surface surveillance) to operational commanders ashore or afloat. It can be used in many roles where other aircraft are controlled and coordinated in accomplishing their unique missions.

3.4 Mine Warfare

The SA MMA will be capable of airborne delivery of mines to support both offensive and defensive mining operations. It will deploy minefields with precision accuracy in both threat and non-threat areas with appropriate self-defense systems to enhance its survivability.

MMA's large payload makes it an attractive option for most mining missions that do not require significant exposure to hostile threats. MMA should be able to deploy significant quantities of mines on a single mission and a squadron of MMA will be able to implant a large minefield quickly and accurately. MMA will deploy minefields sealing off friendly harbors from intruders or blocking key chokepoints to inhibit the enemy's ability to transit either military or civilian vessels without placing them at significant risk.

3.5 Intelligence

The SA MMA will provide a flexible and responsive intelligence gathering platform in support of Navy and National interests. The SA MMA will be capable of collecting acoustic, electronic, radar, electro-optic, and photographic intelligence during overt surveillance and reconnaissance operations. Usually performed simultaneously with other missions (e.g., surface surveillance), the intelligence collection capability inherent in MMA's robust, multi-spectrum sensor suite will prove invaluable.

The SA MMA will be called upon to search for, detect, locate, track and obtain intelligence on targets that many times conceal themselves in other maritime traffic, poor weather and night conditions. MMA will frequently need to provide real or near real time imagery on demand during absence of national systems and will often be required to achieve its objectives without exposing its collection capabilities.

3.6 Command and Control Warfare (C²W) and Information Warfare (IW)

The SA MMA will be capable of searching, detecting, locating, classifying, identifying, targeting, and conducting limited battle damage assessment on electronic emitters. It will be capable of identifying and classifying a variety of electronic emissions. MMA will perform on-board analysis and quickly disseminate preliminary location information. It will provide timely updates to tactical electronic orders of battle. The SA MMA will support Operations Security (OPSEC) and be capable of transitioning rapidly between EMCON conditions. The SA Variant will be capable of conducting coordinated C²W/IW with other forces in support of naval, joint or combined operations.

3.7 Mobility

The SA Variant will be capable of limited self-lift in day, night and all weather operations. It will be capable of self-deployment, carrying much of its own support including maintenance/support personnel and spare parts, mobile operational control centers, command and control personnel and extra crew if necessary. MMA will be responsive in theater to changes in tasking, relocating to forward operating bases within hours instead of days.

3.8 Maritime Targeting and Strike Support

Strike support is an evolving capability that will be incorporated into every SA MMA as a fall-out capability of sensors and connectivity required to perform other key missions. The SA MMA will have the capability to search for and detect, locate, classify, track, and provide combat ID against fixed, relocatable, and moving land and maritime surface targets. The SA MMA will be capable of targeting, denying, disrupting, or destroying maritime threats with its on-board standoff weaponry. The SA MMA will also be capable of disseminating timely targeting information to other platforms capable of striking the threat target.

A fall-out capability of ASU and INT missions is MMA's targeting capability, which will be coupled with a significant air-to-surface weaponry suite. In some cases, the weapons can be re-targeted just prior to weapons launch providing valuable flexibility while shortening the sensor-to-shooter timeline. In other cases, MMA will provide updated, current targeting data to other shooters (e.g., airborne or surface units) that will improve their effectiveness and survivability.

3.9 Secondary Missions

MMA will perform many secondary missions that originate in particular theaters or result from adaptation of the basic capability inherent in a large aircraft with robust communications and sensors. They are rarely design drivers and are usually fall-out capabilities resulting from capability required by primary tasks and functions. Examples include medical evacuations, search and rescue, fishery patrols, counter-drug operations, assisting law enforcement, logistics transport, humanitarian assistance, to include noncombatant evacuation operations (NEO), and peacekeeping tasks.

3.10 Other Considerations

MMA will be supported by land-based C3 centers that provide pre-flight mission planning, in-flight command and control with connectivity to tactical networks, and post-flight analysis/mission reporting. MMA will be capable of in-flight mission planning to capitalize on METOC data collected to update sensor performance predictions, adapt to changes in tasking or to capitalize on fluid on-station tactical situations.

MMA will also capitalize on opportunities to integrate innovative training and logistics concepts that directly contribute to readiness while reducing ownership cost.

Section 4 – Future Capabilities and Requirements

This concept of operations considers capabilities and requirements that will be achievable with technologies expected to be available for an initial production block at the planned IOC date of 2010-2012.

4.1 Unmanned Aerial Vehicle (UAV)

UAVs are currently being developed and equipped to perform intelligence, surveillance, and reconnaissance missions controlled by ground stations. Future UAVs are envisioned to operate either autonomously or in conjunction with manned aircraft. Eventually, they are also envisioned to replace manned aircraft on missions that can be readily adapted to UAV use. Some MPR missions are candidates for transformation from manned aircraft to UAV technology. MMA will seize the initiative in this transformation by adapting existing infrastructure to plan and maintain UAV missions, and to operate and control both the UAV and its sensors.

4.2 Capability Improvements

To facilitate future growth, the SA MMA will have an open system architecture that will allow systems' upgrades to accommodate the application of new technologies to meet new mission requirements. MMA will leverage commercial off-the-shelf technology, developmental subsystems and military capability developed for other programs that can be adapted to MMA missions. Phased capability upgrades will keep MMA relevant throughout its service life. Whether the improvements are routine upgrades or performance leaps that skip a generation in technology, the MPR force will be a major player in these transformational concepts.